

State/Industry Ambient Monitoring Network

Air Quality Report

1st Quarter 2007

Prepared By:

Air Quality Monitoring Branch
Division of Air Quality
North Dakota Department of Health

June 2007

TABLE OF CONTENTS

<u>Description</u>	<u>Page</u>
DISCUSSION OF	
MONITORING RESULTS.	1
Sulfur Dioxide (SO ₂).	2
Sulfur Dioxide (SO ₂) 5-Minute Average.	2
Trace Level Sulfur Dioxide (SO ₂).	2
Trace Level Sulfur Dioxide (SO ₂) 5-Minute Average.	2
Ozone (O ₃).	3
Nitrogen Dioxide (NO ₂).	3
Inhalable Continuous PM _{fine} Particulates.	3
Inhalable PM _{fine} Particulates.	4
Inhalable Continuous PM ₁₀ Particulates.	4
AMBIENT AIR QUALITY DATA	
SUMMARIES.	5
Sulfur Dioxide.	6
Sulfur Dioxide 5-Minute Averages.	7
Trace Level Sulfur Dioxide.	8
Trace Level Sulfur Dioxide 5-Minute Averages.	8
Ozone.	9
Nitrogen Dioxide.	10
Ammonia.	11
Inhalable Continuous PM _{fine} Particulates.	11
Inhalable PM _{fine} Particulates.	12
Inhalable Continuous PM ₁₀ Particulates.	13
EXCEEDANCE LISTINGS.	14
By Site Date Hour.	15
By Date Hour Site.	15

SECTION ONE

DISCUSSION OF MONITORING RESULTS

Sulfur Dioxide (SO₂)

There were no exceedances of either the state or the federal standards during the quarter. The maximum 1-hour concentration was 81 ppb at Hannover and Lostwood NWR; the maximum 3-hour concentration was 60 ppb at Hannover; and, the maximum 24-hour concentration was 15 ppb at Lostwood NWR. The highest arithmetic mean was 2.5 ppb at Lostwood NWR. All sites except for Hess - Tioga #3 achieved at least an 80% data recovery for the period operated.

Hess - Tioga #3 failed to achieve 80% data recovery due to equipment failure.

Sulfur Dioxide (SO₂) 5-Minute Average

The maximum 5-minute concentration was 245 ppb at Bear Paw - MGP #5. All sites except for Hess - Tioga #3 achieved at least an 80% data recovery for the period operated.

Hess - Tioga #3 failed to achieve 80% data recovery due to equipment failure.

Trace Level Sulfur Dioxide (SO₂)

There were no exceedances of either the state or the federal standards during the quarter. The maximum 1-hour concentration was 10.2 ppb at Fargo NW; the maximum 3-hour concentration was 8.0 ppb at Fargo NW; and, the maximum 24-hour concentration was 3.2 ppb at Fargo NW. The highest arithmetic mean was 0.5 ppb at Fargo NW. The site achieved at least an 80% data recovery for the period operated.

Trace Level Sulfur Dioxide (SO₂) 5-Minute Average

The maximum 5-minute concentration was 20.2 ppb at Fargo NW. The site achieved at least an 80% data recovery for the period operated.

Ozone (O₃)

There was no exceedance of the ozone standard during the quarter. The highest observed 1-hour concentration was 56 ppb at Fargo NW. The highest 4th highest 8-hour concentration was 47 ppb at TRNP - SU. All sites achieved at least an 80% data recovery for the period operated.

Nitrogen Dioxide (NO₂)

The highest observed 1-hour concentration was 44 ppb at Bismarck Residential. The maximum arithmetic mean concentration was 8.3 ppb at Bismarck Residential. All sites achieved at least an 80% data recovery for the period operated.

Ammonia (NH₃)

The highest 1-hour concentration was 43.0 ppb at Beulah - North . The site achieved an 80% data recovery for the period.

The data is used as part of the ambient data input used by the newer dispersion models.

Inhalable Continuous PM_{fine} Particulates

The highest 24-hour concentration was 13.5 µg/m³ at Fargo NW. The highest arithmetic mean concentration was 5.7 µg/m³ at Hannover. All sites achieved at least an 80% data recovery for the period operated.

The analyzer used to collect the PM_{fine} was required by EPA, but never given the reference or equivalent designation. Therefore, the data can be used only as an indicator of PM_{fine} concentrations.

Inhalable PM_{fine} Particulates

There was no exceedance of the 24-hour standard during the quarter. The highest 24-hour average concentration was 16.4 $\mu\text{g}/\text{m}^3$ at Beulah - North and Bismarck Residential. The highest arithmetic mean was 7.8 $\mu\text{g}/\text{m}^3$ at Beulah - North. All sites except for TRNP - SU and Beulah - North achieved at least an 80% data recovery for the period.

TRNP - SU and Beulah - North failed to achieve 80% data recovery due to equipment failures.

Inhalable Continuous PM₁₀ Particulates

There was no exceedance of the 24-hour standard during the quarter. The maximum 24-hour concentration was 29.8 $\mu\text{g}/\text{m}^3$ at Fargo NW. The highest arithmetic mean was 12.2 $\mu\text{g}/\text{m}^3$ at Bismarck Residential. All sites achieved an 80% data recovery for the period.

SECTION TWO

AMBIENT AIR QUALITY DATA

SUMMARIES

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : **Sulfur Dioxide** (ppb)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	1 - HOUR		M A X I M A		24 - HOUR		ARITH MEAN	1HR #>273	24HR #>99	% >MDV
				1ST	2ND	1ST	2ND	1ST	2ND				
Bear Paw - MGP #3	2007	JAN-MAR	2142	12	11	11	7	4	3	1.2			8.6
Bear Paw - MGP #5	2007	JAN-MAR	2144	25	24	14	10	4	3	1.2			8.6
Beulah - North	2007	JAN-MAR	2143	51	43	35	13	6	6	1.6			18.9
Bismarck Residential	2007	JAN-MAR	2145	40	39	31	26	10	8	2.2			27.2
DGC #12	2007	JAN-MAR	2112	60	26	32	15	6	5	1.7			17.7
DGC #14	2007	JAN-MAR	2085	46	29	20	13	4	4	1.4			10.3
DGC #16	2007	JAN-MAR	2148	48	29	24	19	7	5	1.6			16.4
DGC #17	2007	JAN-MAR	2115	42	38	24	17	7	5	1.5			14.8
Dunn Center	2007	JAN-MAR	2144	22	10	10	7	2	2	1.2			8.3
Hannover	2007	JAN-MAR	2144	81	68	60	39	9	7	1.9			17.5
Hess - Tioga #1	2007	JAN-MAR	2111	46	40	39	22	8	8	1.9			20.2
Hess - Tioga #3	2007	JAN-MAR	594 ***	32	30	23	19	10	5	2.1			21.0
Lostwood NWR	2007	JAN-MAR	2146	81	50	33	30	15	10	2.5			28.2
TRNP - NU	2007	JAN-MAR	2152	12	11	8	6	4	2	1.1			6.6
TRNP - SU	2007	JAN-MAR	2151	13	8	9	5	3	2	1.0			2.3

The highest 1-hour concentration is 81 ppb at Hannover
The highest 3-hour concentration is 60 ppb at Hannover
The highest 24-hour concentration is 15 ppb at Lostwood NWR
The highest arithmetic mean is 2.5 ppb at Lostwood NWR

* The air quality standards are:

STATE Standards -

- 1) 273 ppb maximum 1-hour average concentration.
- 2) 99 ppb maximum 24-hour average concentration.
- 3) 23 ppb maximum annual arithmetic mean concentration.

FEDERAL Standards -

- 1) 500 ppb maximum 3-hour concentration not to be exceeded more than once per year.
- 2) 140 ppb maximum 24-hour concentration not to be exceeded more than once per year.
- 3) 30 ppb annual arithmetic mean.

*** Less than 80% of the possible samples (data) were collected.

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : **Sulfur Dioxide 5-Minute Averages** (ppb)

LOCATION	YEAR	SAMPLING PERIOD	5 - M I N U T E	M A X I M A			# HOURS >600	% >MDV
			NUM OBS	1ST	2ND	3RD		
Bear Paw - MGP #3	2007	JAN-MAR	2142	13	12	12	0	15.5
Bear Paw - MGP #5	2007	JAN-MAR	2144	245	69	62	0	19.9
Beulah - North	2007	JAN-MAR	2142	73	59	51	0	29.9
Bismarck Residential	2007	JAN-MAR	2101	80	62	59	0	39.3
Dunn Center	2007	JAN-MAR	2144	48	16	15	0	19.5
Hannover	2007	JAN-MAR	2144	136	122	98	0	25.7
Hess - Tioga #1	2007	JAN-MAR	2111	98	87	86	0	28.8
Hess - Tioga #3	2007	JAN-MAR	594 ***	124	91	91	0	30.1
Lostwood NWR	2007	JAN-MAR	2146	108	90	65	0	36.3
TRNP - NU	2007	JAN-MAR	2152	18	17	16	0	14.4
TRNP - SU	2007	JAN-MAR	2151	17	13	12	0	6.1

The maximum 5-minute concentration is 245 ppb at Bear Paw - MGP #5

* No Standard is currently in effect:

*** Less than 80% of the possible samples (data) were collected.

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : **Trace Level Sulfur Dioxide** (ppb)

LOCATION	YEAR	SAMPLING PERIOD	OBS	1 - HOUR		M A X I M A 3 - HOUR		24 - HOUR		ARITH MEAN	1HR #>273	24HR #>99	% >MDV
				1ST	2ND	1ST	2ND	1ST	2ND				
Fargo NW	2007	JAN-MAR	2143	10.2	8.8	8.0	6.8	3.2	2.2	0.5			66.4

The highest 1-hour concentration is 10.2 ppb at Fargo NW
The highest 3-hour concentration is 8.0 ppb at Fargo NW
The highest 24-hour concentration is 3.2 ppb at Fargo NW
The highest arithmetic mean is 0.5 ppb at Fargo NW

* The air quality standards are:

STATE Standards -

- 1) 273 ppb maximum 1-hour average concentration.
- 2) 99 ppb maximum 24-hour average concentration.
- 3) 23 ppb maximum annual arithmetic mean concentration.

FEDERAL Standards -

- 1) 500 ppb maximum 3-hour concentration not to be exceeded more than once per year.
- 2) 140 ppb maximum 24-hour concentration not to be exceeded more than once per year.
- 3) 30 ppb annual arithmetic mean.

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : **Trace Level Sulfur Dioxide 5-Minute Averages** (ppb)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	5 - MINUTE MAXIMA			DATE >600	# HOURS >MDV	% >MDV
				1ST	2ND	3RD			
Fargo NW	2007	JAN-MAR	2137	20.2	13.0	9.8	0	79.4	

The maximum 5-minute concentration is 20.2 ppb at Fargo NW

* No Standard is currently in effect:

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : **Ozone** (ppb)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	1 - 1ST	M - HOUR 2ND	A X 1ST	I 2ND	M - HOUR 3RD	A 4TH	1HR #>120	8HR #>80
Beulah - North	2007	JAN-MAR	2142	50	49	45	45	45	45		
Bismarck Residential	2007	JAN-MAR	2145	49	48	46	42	42	41		
Dunn Center	2007	JAN-MAR	2144	50	48	48	44	43	42		
Fargo NW	2007	JAN-MAR	2143	56	53	50	49	48	46		
Hannover	2007	JAN-MAR	2147	52	50	49	47	46	45		
Lostwood NWR	2007	JAN-MAR	2149	51	50	49	46	46	45		
TRNP - NU	2007	JAN-MAR	2153	54	51	50	50	47	45		
TRNP - SU	2007	JAN-MAR	2151	50	50	49	49	48	47		

The highest 1-hour concentration is 56 ppb at Fargo NW
The 4th highest 8-hour concentration is 47 ppb at TRNP - SU

* The air quality standards for ozone are:
STATE - 120 ppb not to be exceeded more than once per year.

FEDERAL Standards -

- 1) 120 ppb maximum 1-hour concentration with no more than one expected exceedance per year.
- 2) Fourth highest daily maximum 8-hour averages for a 3-year period not to exceed 80 ppb.

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : **Nitrogen Dioxide** (ppb)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	M A X A M A 1 - HOUR		ARITH MEAN	% >MDV
				1ST	2ND		
Beulah - North	2007	JAN-MAR	2134	20	18	2.5	85.7
Bismarck Residential	2007	JAN-MAR	2140	44	43	8.3	99.3
DGC #12	2007	JAN-MAR	2109	37	21	2.4	79.6
DGC #17	2007	JAN-MAR	2114	24	23	1.7	63.2
Dunn Center	2007	JAN-MAR	2139	13	8	1.0	52.1
Fargo NW	2007	JAN-MAR	2142	40	38	5.6	90.8
Hannover	2007	JAN-MAR	2139	30	26	2.2	81.6
Lostwood NWR	2007	JAN-MAR	2143	26	20	2.0	75.0
TRNP - NU	2007	JAN-MAR	2148	10	8	0.8	37.1

The highest 1-hour concentration was 44 ppb at Bismarck Residential
The maximum Arithmetic Mean concentration is 8.3 ppb at Bismarck Residential

* The air quality standards are:
STATE - 53 ppb maximum annual arithmetic mean.

FEDERAL - 53 ppb annual arithmetic mean.

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : **Ammonia** (ppb)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	M A X I M A 1 - HOUR					
				1ST	2ND	3RD	4TH	5TH	6TH
Beulah - North	2007	JAN-MAR	2121	43.0	42.9	39.0	35.8	35.5	35.2

* No Standard is currently in effect:

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : **Inhalable Continuous PM_{fine} Particulates** (µg/m³)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	M A X I M A 1 - HOUR						24 - HOUR			ARITH	24HR
				1ST	2ND	1ST	2ND	3RD	4TH	MEAN	#>65	AM>15		
Beulah - North	2007	JAN-MAR	2142	42.8	35.6	10.5	10.3	8.1	7.7	3.0				
Bismarck Residential	2007	JAN-MAR	2092	23.2	22.4	10.0	8.2	7.8	7.6	3.6				
Dunn Center	2007	JAN-MAR	2117	22.8	21.4	8.4	7.8	6.1	6.0	2.4				
Fargo NW	2007	JAN-MAR	2134	48.6	43.1	13.5	7.0	6.5	6.0	3.3				
Hannover	2007	JAN-MAR	2129	72.7	45.2	13.3	10.7	10.0	9.1	5.7				
Lostwood NWR	2007	JAN-MAR	2144	15.5	13.8	9.5	7.0	6.6	5.4	2.3				
TRNP - NU	2007	JAN-MAR	2148	35.5	33.1	9.2	9.1	6.9	6.0	2.1				
TRNP - SU	2007	JAN-MAR	2125	29.2	28.9	12.4	11.5	10.2	9.2	5.0				

The highest 24-hour concentration is 13.5 µg/m³ at Fargo NW
The highest Annual Mean concentration is 5.7 µg/m³ at Hannover

* The EPA-required analyzer used to collect this data is not a reference or equivalent method, this data can not be compared to the PM_{fine} standards. This data can only be used as an indicator of the actual PM_{fine} ambient concentrations. If this data were to indicate there may be an exceedance of the ambient standards, then the department could be required to install a designated reference or equivalent sampler.

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : **Inhalable PM_{fine} Particulates** ($\mu\text{g}/\text{m}^3$)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	MIN	M A X I M A 24 - HOUR			ARITH MEAN	#> 65	AM>15	% >MDV
					1ST	2ND	3RD				
Beulah - North	2007	JAN-MAR	13	2.3	16.4	13.5	11.8	7.9			100.0
Bismarck Residential	2007	JAN-MAR	29	3.0	16.4	12.6	11.6	7.4			100.0
Fargo NW	2007	JAN-MAR	28	2.8	12.9	12.4	11.3	7.2			100.0
TRNP - SU	2007	JAN-MAR	13	1.3	12.1	10.4	6.8	5.0			92.3

The highest 24-hour concentration was 16.4 $\mu\text{g}/\text{m}^3$ at Beulah-North
The highest annual mean concentration was 7.9 $\mu\text{g}/\text{m}^3$ at Beulah-North

* The ambient air quality standards are:
FEDERAL Standards -

- 1) 24-hour: 3-year average of 98th percentiles not to exceed 35 $\mu\text{g}/\text{m}^3$.
- 2) Annual: 3-year average not to exceed 15 $\mu\text{g}/\text{m}^3$.

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : **Inhalable Continuous PM₁₀ Particulates** (µg/m³)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	1 1ST	— HOUR 2ND	M A X I M A 24 — HOUR 3RD	1ST	2ND	4TH	MEAN	ARITH #>150	24HR AM>50
Beulah - North	2007	JAN-MAR	2140	95.0	84.0	29.8	22.2	16.7	15.8	9.2		
Bismarck Residential	2007	JAN-MAR	2111	98.0	97.0	29.6	29.1	26.1	23.5	12.2		
Dunn Center	2007	JAN-MAR	2134	53.0	49.0	18.9	17.4	16.3	14.9	8.0		
Fargo NW	2007	JAN-MAR	2139	68.0	48.0	19.8	19.6	18.0	14.6	8.5		
Lostwood NWR	2007	JAN-MAR	2144	183.0	100.0	20.3	18.7	16.3	12.8	6.9		
TRNP - NU	2007	JAN-MAR	2148	43.0	43.0	17.3	13.5	13.0	11.9	6.4		

The highest 24-hour concentration is 29.8 µg/m³ at Beulah - North

The highest Annual Mean concentration is 12.2 µg/m³ at Bismarck Residential

* The STATE and FEDERAL air quality standards are:

- 1) 150 µg/m³ maximum averaged over a 24-hour period with no more than one expected exceedance per year.
- 2) 50 µg/m³ expected annual arithmetic mean.

SECTION THREE

EXCEEDANCE LISTINGS

By Site Date Hour

All Units Are in Parts Per Billion Except Wind Direction (Degrees),
Wind Speed (MPH), CO (PPM), and PM_{fine} and PM₁₀ (µg/m³)

The * Identifies the Exceedances

NONE

By Date Hour Site

All Units Are in Parts Per Billion Except Wind Direction (Degrees),
Wind Speed (MPH), CO (PPM), and PM_{fine} and PM₁₀ (µg/m³)

The * Identifies the Exceedances

NONE